

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/EP2004/009183

International filing date (day/month/year)
16.08.2004

Priority date (day/month/year)
15.08.2003

International Patent Classification (IPC) or both national classification and IPC
H01M10/04, H01M10/40, H01M10/48, H01M2/08, H01M4/02

Applicant
PACIFIC LITHIUM NEW ZEALAND LIMITED

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☒ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

10/568129
IAP9 Rec'd PCT/PTO 14 FEB 2005
International application No.
PCT/EP2004/009183

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | |
|-------------------------------|-------------|------|
| Novelty (N) | Yes: Claims | 1-26 |
| | No: Claims | |
| Inventive step (IS) | Yes: Claims | |
| | No: Claims | 1-26 |
| Industrial applicability (IA) | Yes: Claims | 1-26 |
| | No: Claims | |

2. Citations and explanations

see separate sheet

Box No. VI Certain documents cited

1. Certain published documents (Rules 43bis.1 and 70.10)

and /or

2. Non-written disclosures (Rules 43bis.1 and 70.9)

see form 210

Re Item V.

- 1 Reference is made to the following document:
D1 : US 2002/051904 A1 (ITOH TAKANORI ET AL) 2 May 2002 (2002-05-02)
D2: WO 03/012908 A (MASSACHUSETTS INSTITUTE OF TECHNOLOGY; A123 SYSTEMS) 13 February 2003 (2003-02-13)
D3: WO 03/047021 A (COMMISSARIAT A L'ENERGIE ATOMIQUE; MARTINET, SEBASTIEN; LE CRAS, FREDE) 5 June 2003 (2003-06-05)
D4: EP-A-0 973 180 (ASAHI GLASS COMPANY LTD) 19 January 2000 (2000-01-19)
- 2 INDEPENDENT CLAIM 1
 - 2.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 does not involve an inventive step in the sense of Article 33(3) PCT.
 - 2.1.1 Document D1 discloses (the references in parentheses applying to this document):
A bipolar high power battery device, comprising: a) at least one group (A, B) of n stackable electrochemical energy storage cells (12a, 12b, 12c, 12n; 14a, 14b, 14c, 14n), connected in series, where $2 < n < 50$, the energy storing cells having: a lithium ion insertion cathode (paragraph 36) on a current collector substrate and a lithium ion insertion anode (paragraph 37) on a current collector substrate, a separator material (paragraph 40) associated between the anode and the cathode; and an electrolyte system (paragraph 38); means for voltage monitoring of subgroups of m storage cells (paragraph 42) connected in series, where $m < n$ (claim 3) and $2 < m < 10$ (examples 1, 2, 3, 5, 6 and 7).
 - 2.1.2 The subject-matter of claim 1 therefore differs from this known bipolar high power battery device in that:
 - (i) an **anode-to-cathode capacity ratio r fulfills $0.6 < r < 1.3$** , in that
 - (ii) there is a **leak-proof seal structure** and in that
 - (iii) there are **means for keeping the battery under compression**.

2.1.3 The problems to be solved by the present invention may therefore be regarded as:

- (i) to provide a high power battery in bipolar configuration with means for voltage monitoring of subgroups of storage cells with **improved discharge reliability**,
- (ii) to **prevent this battery from leaking** and
- (iii) to **ensure good mechanical and electrical contact between layers** of this battery.

2.1.4 The solution proposed in claim 1 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

- In relation to the problem of improved discharge reliability (i):
It is known in the prior art of Li-ion secondary batteries to have an anode-to-cathode capacity ratio, r , in the claimed range of $0.6 < r < 1.3$, for example, document D2, page 68, where $r = 1.05$; document D4, paragraph 6, where $0.1 < 1/r < 1.2$, i.e., $0.83 < r < 10$, is chosen for the purpose of an improved discharge reliability. Therefore, the influence of r in the discharge reliability of Li-ion secondary batteries is also known from the prior art.
- In relation to the problem of battery leaking prevention (ii) and of good mechanical and electrical contact between layers of the battery (iii):
it is widely known in the field of batteries, and more specifically in the field of the Li-ion batteries, the use leak-proof sealing structures to prevent batteries from leaking and the use of means for keeping the battery under compression. For example, see document D3, page 20, lines 5 and 6 for a leak-proof seal structure and page 19, line 11 for compression means.
The claimed invention consists merely in a juxtaposition or association of known devices or parameters functioning in their normal way and not producing any non-obvious working inter-relationship (Guidelines, C, IV - Annex 2.1).

3. DEPENDENT CLAIMS 2-26

Dependent claims 2-26 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step (Article 33(2) and (3) PCT).